Climate of Wisconsin

Introduction

This publication consists of a narrative that describes some of the principal climatic features and a number of climatological summaries for stations in various geographic regions of the State. The detailed information presented should be sufficient for general use; however, some users may require additional information.

The National Climatic Data Center (NCDC) located in Asheville, North Carolina is authorized to perform special services for other government agencies and for private clients at the expense of the requester. The amount charged in all cases is intended to solely defray the expenses incurred by the government in satisfying such specific requests to the best of its ability. It is essential that requesters furnish the NCDC with a precise statement describing the problem so that a mutual understanding of the specifications is reached.

Unpublished climatological summaries have been prepared for a wide variety of users to fit specific applications. These include wind and temperature studies at airports, heating and cooling degree day information for energy studies, and many others. Tabulations produced as by-products of major products often contain information useful for unrelated special problems.

The Means and Extremes of meteorological variables in the Climatography of the U.S. No.20 series are recorded by observers in the cooperative network. The Normals, Means and Extremes in the Local Climatological Data, annuals are computed from observations taken primarily at airports.

The editor of this publication expresses his thanks to those State Climatologists, who, over the years, have made significant and lasting contributions toward the development of this very useful series.

State and Station Normals are available at:
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Topographic Features- Wisconsin lies in the upper Midwest between Lake Superior, Upper Michigan, Lake Michigan, and the Mississippi and Saint Croix rivers. The State's greatest length is 320 miles, greatest width 295 miles, and total land area is 56,154 square miles. Glaciation during the last two million years has largely determined the topography and soils of the State, except for the 13,360 square miles of "Driftless" area in southwestern Wisconsin. The various glaciations created a rolling terrain with nearly 15,000 lakes and several areas of marshes and swamps. Elevations range from about 580 feet above sea level along the Lake Michigan shore to 1,951 feet at Timms Hill in north-central Wisconsin.

The Northern Highland, a plateau extending across northern Wisconsin, is an area covering approximately one-quarter of the State with elevations from 1,000 to 1,800 feet. This area has many lakes and is the origin of many of the major streams in the State. The slope down to the narrow Lake Superior Lowland is quite steep. The Central Plain is a comparatively flat, crescent shaped lowland that lies immediately south of the Northern Highland and embodies nearly one-fourth of Wisconsin. The Eastern Ridges and Lowlands to the southeast of the Central Plain are the most densely populated and have the highest concentration of industry and farms. The Western Uplands of southwestern Wisconsin west of the Eastern Ridges and Lowlands and southwest of the Central Plain make up about one-fourth of the State. This region, within the Driftless area, has some of the State's greatest topographic relief, rising 200 to 350 feet above the Central Plains and 100 to 200 feet above the Eastern Ridges and Lowlands. The Mississippi River bluffs rise 230 to 650 feet.

The land drains into lakes Superior and Michigan and the Mississippi River. The Mississippi and St. Croix Rivers form most of the western boundary. About one-half of the northwestern portion of the State is drained through the Chippewa River, while the remainder of this region drains directly into the Mississippi and the St. Croix watershed, or into Lake Superior. The Wisconsin River has its source at a small lake nearly 1,600 feet above mean sea level on the Upper Michigan boundary and drains most of central Wisconsin. Most of its tributaries also spring from the many lakes in the north. Except for the Rock River, a Mississippi River tributary that flows through northern Illinois, eastern Wisconsin drains into Lake Michigan, with the Fox River being one of the major rivers.

Many of the streams and lakes in northern Wisconsin are ice covered from late November to early April, while southern lakes often are ice covered from late December to late March. Snow covers the ground in practically all the winter months, except in southern areas, where 50 to 75 percent of winter days have snow cover. Flooding is most frequent and most serious during April, due to the melting of snow and spring rains. During this period, flood conditions are often aggravated by ice jams that clog the floodwaters. Excessive rains from thunderstorms sometimes produce tributary flooding or flash flooding along the smaller streams and creeks.

The Wisconsin climate is typically continental with some modification by lakes Michigan and Superior. The cold, snowy winters favor a variety of winter sports, and the warm summers appeal to thousands of vacationers each year. About two-thirds of the annual precipitation falls during the growing season (freeze-free period). It is normally adequate for vegetation, although

drought is occasionally reported. This climate is most favorable for dairy farming; the primary crops are corn, small grains, hay and vegetables. The rapid succession of storms moving from west to east or southwest to northeast accounts for the stimulating climate.

Temperature- Across the State, average annual temperatures varies from about 40 degrees Fahrenheit (º F) in the north to 48 in the south. The highest temperature ever recorded in Wisconsin was 114º F at Wisconsin Dells on July 13, 1936, and the lowest temperature on record is -55º F, reported near Couderay on February 4, 1996.

During more than one-half of the winters, temperatures fall to -40 or lower, and almost every winter temperatures of -30º F or lower are reported from northern stations. Summer temperatures above 90º F average two to four days in northern counties and about 14 days in southern districts. During marked cool outbreaks in the summer months, the central lowlands occasionally report freezing temperatures.

The freeze-free season ranges from nearly 100 days per year in the northeast and north-central lowlands to slightly more 180 days in the Milwaukee area. The pronounced moderating effect of Lake Michigan is well illustrated by the fact that the growing season of 150 to 170 days along the east-central shoreline is of the same duration as in the State's southwestern valleys. The short growing season in the central Wisconsin is attributed to a number of factors, among them, an inward cold air drainage and the low heat capacities of the peat and sandy soils. The median date of last spring freeze ranges from early May along the Lake Michigan coastal area and southern counties to early June in the northernmost counties. The first fall freezes occur in late August and early September in the northern and central lowlands to mid-October along the Lake Michigan coastline. However, a July freeze is not unusual in the north and central lowlands.

Precipitation- The long-term mean annual precipitation ranges from 30 to 34 inches over most of the Western Uplands and Northern Highland, then diminishes to about 28 inches along most of Wisconsin bordering Lake Michigan, most of the Wisconsin Central Plain and the Lake Superior Lowland. The higher average annual precipitation coincides generally with the highest elevations, particularly the windward slopes of the Western Uplands and Northern Highland. Thunderstorms are typically a summertime phenomenon, with northern Wisconsin averaging approximately 30 days during the year when thunder is heard, while southern counties usually have about 40 thunderstorm days per year. Occasional hail, wind and lightning damage are also reported with these thunderstorms. On average, Wisconsin experiences approximately 19 tornadoes per year. Many of the tornadoes either track across southern Wisconsin or the northwest quarter of the State. Wisconsin tornado frequency is highest in June and July, followed in order by April, May, and September.

The average seasonal snowfall varies from about 30 inches at Beloit to over 160 inches in northern Iron County along the steep western slope of the Gogebic Range. The heavy snowfall along the Gogebic Range is a result of the prevailing cold northerly winter winds crossing the relatively warm water of Lake Superior. Greater average snowfall is recorded over the Western Uplands and Eastern Ridges than in the adjacent lowlands. The mean dates of the first snowfall of consequence, an inch or more, vary from early November in northern localities to early December in southern Wisconsin counties. Average annual duration of snow cover ranges from 65 days in southernmost Wisconsin to more than 140 days along Lake Superior. The snow cover acts as a protective insulation for grasses, autumn seeded grains and other vegetation.

Climate and the Economy- The fertile soils, gently rolling terrain and agreeable climate favor

dairy farming in southern and eastern Wisconsin. Many southern and eastern counties have over 70 percent of the land in farms as contrasted to the northern third of the State where less than 50 percent of the land is in farms.

Farmland constitutes about 45 percent of the total land area of Wisconsin. The primary crops are hay, soybeans, oats and corn. Milk is the largest single source of farm income, surpassing the combined farm income of all other products. Wisconsin farm income for the past several years has ranked among the top ten states of the nation. Wisconsin is among the leaders in the following commercial vegetables harvested: green peas, sweet corn, cucumbers for pickles, snap beans, beets, cabbage for sauerkraut, carrots and tomatoes. Marshy areas have been utilized for cranberry growing in central and northern localities, with State production now first in the nation. Food processing is an important and growing industry.

Forests cover approximately 46 percent of the State and they furnish much of the pulpwood used in the paper industry. Manufacturing represents the State's major economic activity, along with the dairy industry. Wisconsin has long been famous for its rolling hills, fertile valleys and plains dotted with many clear lakes. It has a stimulating climate well suited to the numerous recreational activities available to those who enjoy the great outdoors.

The original to this document also appears on

http://www.aos.wisc.edu/~sco/stateclimate.html
Additional Information from:
Moran, J.M. and E.J. Hopkins, 2002: Wisconsin's Weather and Climate. University of Wisconsin Press, Madison.

http://www.nass.usda.gov/wi/misc/nofmhist.htm

http://www.nass.usda.gov/census/census97/highlights/wi/wi.htm

See 2001-2002 Wisconsin Blue Book http://www.legis.state.wi.us/lrb/bb/index.htm

http://www.legis.state.wi.us/lrb/bb/ch8b.pdf for farm statistics

http://www.legis.state.wi.us/lrb/bb/ch8h.pdf for climate information